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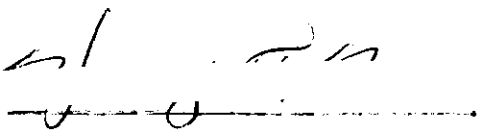

THE ROLE OF THE STATES IN GUIDING AND CONTROLLING LAND USE IN FLOOD PLAINS

A THESIS

Presented to the

Faculty of the Graduate Division

By

Henry F. Morse

In Partial Fulfillment

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THE ROLE OF THE STATES IN GUIDING AND CONTROLLING

LAND USE IN FLOOD PLAINS

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SUMMARY

The nation's annual flood losses have continued to increase even though the Federal government has spent billions of dollars for flood control projects. Federal, state, and local officials have recently given serious attention to programs for regulating land use in flood plains as a means of reducing flood damage.

The purpose of this study was to determine the role of the states in guiding and controlling land use in flood plains. The study points out that the states have a major responsibility for regulating land use in flood hazard areas because Federal agencies do not have such authority and local governments cannot control land use in these portions of the flood plains which extend beyond local governmental jurisdictions.

The study investigated existing programs of state water resource agencies and state planning agencies to determine state activities which have been successful in reducing flood damage and to discover problems which the states have encountered in guiding and controlling land use in flood plains.

Most state water resource programs which have an impact on flood problems have been administered by two or more state agencies without sufficient coordination to present a unified attack on flood problems. Only a few states have developed effective programs for water resource administration.

A relatively small number of state planning agencies have been actively concerned with flood problems. Most state planning agencies

are not properly located within the framework of state government to develop comprehensive statewide plans and policies which give attention to flood problems.

This study points out the need for both an effective state planning agency and a state water resource agency with closely coordinated programs for flood damage prevention. Intra-state regional organizations for both water resource administration and for planning are also recommended.

The study recommends that a comprehensive state flood damage prevention program include but not be limited to: (1) collection, distribution and interpretation of flood data; (2) programs to promote public understanding of flood problems; (3) state regulation of land use in flood plains; (4) financial assistance to localities for solving flood problems; (5) technical assistance; and (6) review of Federal flood control projects.

CHAPTER I

INTRODUCTION

The United States, in its fight against floods, is in much the same position as a man who carefully screens his home against mosquitoes and then moves his family out into the yard where the little pests thrive. This country has spent huge sums for structures to hold back floods in some areas and yet has permitted more and more people to build homes and plants in the path of floods elsewhere. The rapid and continuing population growth of the past decades has been accompanied by extensive urban expansion and development, much of it in flood plain areas. As occupancy of flood plains has spread, the flood damage potential has increased. As a result, flood losses mount despite the expenditure of some 11 billion dollars since 1936 for dams and levees and other protective works (1).

The flood-control structures are splendid and efficient engineering accomplishments. Obviously, they are not the whole answer to the problem; other solutions are desperately needed.

New concepts for reducing the flood-damage potential of the nation have evolved during the past decade. The Tennessee Valley Authority developed a cooperative program of flood-damage prevention starting in 1953. TVA recommended to the President in late 1958 and to the Congress early in 1959 a national program based on the success of that local-state-Federal program. In transmitting the report and recommendations Brig. General Herbert D. Vogel, Chairman, Board of Directors, Tennessee Valley Authority, expressed the philosophy:

> Communities throughout the Nation are engaged in a new contest with their rivers and they are losing. They will continue to lose unless steps are taken to provide a new perspective--and a new channel of action--with respect to floods.
>
> The problem arises from the basic fact that there are some floods which cannot be prevented and many cities that cannot be fully protected economically with artificial works such as dams and levees. Coupled with this fact is the rapid growth of urban communities, creating new pressures to utilize inviting but hazardous flood plains for subdivisions, shopping centers, commercial establishments, and other improvements. This mushrooming trend is creating new flood-damage potential faster than construction works can add to existing protection (2).

Representatives of state, Federal, and local agencies assembled in Chicago in December 1958 for the first National Conference on Flood Plain Regulations and Insurance. It is significant that these officials had never met before on a nationwide basis to discuss new methods of solving flood problems even though their agencies had spent several billions of dollars trying unsuccessfully to solve or reduce flood problems through construction of outstandingly successful engineering works. In summarizing the meeting Gilbert F. White stated, in part:

> Those who know the facts no longer see the problem as one to be solved by engineering alone or by engineering in combination with upstream land management. They see it as engineering plus community planning in the broad sense. The measures for flood damage reduction may include changes in buildings, improved flood forecasting, zoning ordinances, subdivision regulations, and building codes, supplemented by insurance. This is a major change in attitude. Moreover, it is recognized that this is not exclusively a Federal responsibility; it is a cooperative problem (3).

Within the context of the broad planning approach advanced by TVA, White, and others, the regulation of land use in flood plains is an important program activity.

Regulation of land use in flood plains necessarily involves cooperation of local, state, and Federal agencies because most streams, rivers,

and watershed areas are not coterminous with political jurisdictions. Flood problems often involve areas that extend beyond the jurisdictions of local and state governments and sometimes beyond the jurisdiction of the Federal Government.

This study was undertaken to determine how the states can cooperate effectively with Federal and local governments and with other states in reducing flood-damage potential by guiding and controlling land use in flood plains. Chapter II presents a description and analysis of current state flood-damage prevention programs including the efforts to guide and control land use in flood plains. Chapter III describes the current relationships between the water resource agencies and the planning agencies in administering water resource programs, including flood-damage prevention. Chapter IV presents suggestions for the role of the states in guiding and controlling land use in flood plains as part of a comprehensive and dynamic program of state planning and development.

Information for this study was obtained through inquiries sent to the forty-five existing state planning and development agencies, to forty-three state water resource agencies, and to fifteen city or regional planning agencies. In addition an extensive review was made of available reports and other pertinent literature describing flood-damage prevention programs and patterns of state and local administration.

CHAPTER II

DESCRIPTION AND ANALYSIS OF STATE FLOOD DAMAGE PREVENTION PROGRAMS

Knowledge of current flood-damage prevention programs in the several states is essential to an understanding of the proper role of such programs in guiding land use in flood plains. Many of the states are making determined efforts to develop flood-damage prevention programs. Some of them now have statewide water resource plans which include provisions for relating the water resource activities to over-all state development.

This chapter presents a general description and analysis of state flood-damage prevention programs and discusses the problems which the states have encountered. Figure 1 illustrates the elements which might be included in a comprehensive flood damage prevention program.

The states are engaged in a wide variety of activities that are related to flood-damage prevention and have an impact on land use in flood plains (see Table 1). These activities can be classified generally into four types: (1) collection, distribution, and interpretation of flood data; (2) review and construction of flood control projects; (3) flood-plain regulations; and (4) planning programs affecting land use in flood plains. These activities are described below.

Collection, Distribution, and Interpretation of Flood Data

Virtually all of the states are engaged in one or more programs to

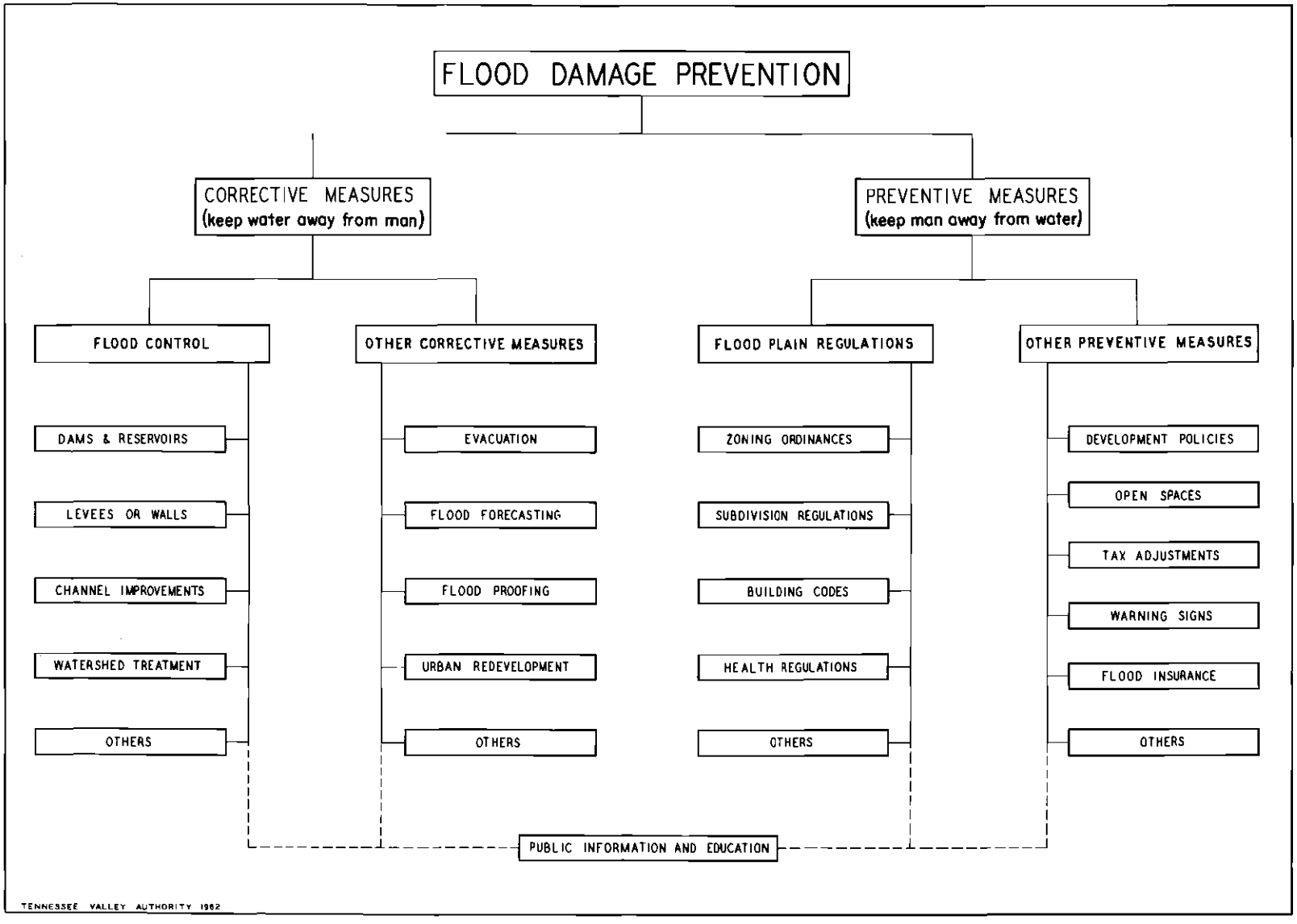

Figure 1. Elements of a Flood Damage Prevention Program.

Table 1. Summary of Authorized State Water Resource Agency Activities Related to Flood Damage Prevention

STATE	GENERAL FUNCTIONS													STATEWIDE PLANS & POLICIES		
	NUMBER OF AGENCIES	COLLECT FLOOD DATA	DISTRIBUTE FLOOD DATA	PROVIDE TECHNICAL ASSISTANCE ON LOCAL FLOOD PROBLEMS	ESTABLISH FLOODWAYS OR ENCROACHMENT LINES	CONSTRUCT & OPERATE FLOOD CONTROL WORKS 1/	MAKE GRANTS & LOANS FOR LOCAL FLOOD WORKS 1/	REVIEW CORPS OF ENGINEERS PROJECTS	REVIEW SCS PROJECTS 1/	REVIEW BUREAU OF RECLAMATION PROJECTS	REVIEW DESIGN OF WATER CONTROL STRUCTURES	COORDINATE STATE WATER RESOURCE AGENCY PROGRAMS	ONE AGENCY HAS AUTHORITY FOR OVER-ALL WATER RESOURCE PLAN	OVER-ALL WATER RESOURCE PLANNING ACTIVITY CONCERNED WITH:	
														FLOOD CONTROL WORKS	LAND USE CONTROLS
ALABAMA	2	■							●						
ALASKA	1	■													
ARIZONA	4	■				C O		■	●	●	●				
ARKANSAS	2	■	●					■	■		●				
CALIFORNIA	1	■	●	●		C O	G L	■	■	●	●	●	●	●	
COLORADO	2	■						■	■	●	●				
CONNECTICUT	1	■			●			■	●		●	●	●	●	●
DELAWARE	3	■						■	●						
FLORIDA	3	■		●		C O		●	■			●	●	●	
GEORGIA	2	■						■	■						
HAWAII	1	■	●					■	■		●	●	●	●	
IDAHO	1	■						●	■	●	●	●	●	●	
ILLINOIS	4	●	●			C O		●	■		●	●	●	●	
INDIANA	1	●	●	●	●	O		■	■		●	●	●	●	●
IOWA	3	■	●		●			■	■		●		●	●	●
KANSAS	4	■						■	■	●	●	●	●	●	
KENTUCKY	1	■	●		●			●	■				●	●	●
LOUISIANA	2	■	●			C O	G	●	●		●				
MAINE	2	●						■	●		●				
MARYLAND	2	■	●					■	■		●				
MASSACHUSETTS	2	■			●	C O		●	●			●	●	●	●
MICHIGAN	3	●	●					■	■						
MINNESOTA	3	■	●			O		●	●		●	●			
MISSISSIPPI	3	●						●	●				●	●	
MISSOURI	2	■						●	●			●	●	●	
MONTANA	3	■						●	■	●	●	●			
NEBRASKA	2	●						■	■	●	●				
NEVADA	1	■						●	●	●			●	●	
NEW HAMPSHIRE	3	■				C O		■	■		●	●			
NEW JERSEY	1	●	●	●	●	C O		●	■		●	●	●	●	●
NEW MEXICO	1	●				C		■	●	●	●		●	●	
NEW YORK	4	■				O		■	■		●		●	●	
NORTH CAROLINA	2	●		●				■	■			●	●	●	
NORTH DAKOTA	2	■				C O	G	■	●	●					
OHIO	1	●	●	●		C		●	■			●	●	●	●
OKLAHOMA	3	●	●					■	■	●		●			
OREGON	2	■						■	■	●		●	●	●	
PENNSYLVANIA	1	●	●	●	●	C O		●	●		●	●	●	●	●
RHODE ISLAND	3	●		●				●	■		●	●			
SOUTH CAROLINA	1	■						■	■						
SOUTH DAKOTA	3	●						■	■	●	●				
TENNESSEE	2	■	●					■	■				●	●	
TEXAS	2	●						●	■	●	●				
UTAH	3	■	●				G	■	●	●			●	●	
VERMONT	1	■				O		■	■				●	●	
VIRGINIA	2	●						●	■		●				
WASHINGTON	1	■		●	●		G	■	●	●	●		●	●	●
WEST VIRGINIA	3	●						■	■		●		●	●	
WISCONSIN	3	■	●					●	■		●				
WYOMING	3	●					G L	●	●	●	●		●	●	

SOURCE: HANDBOOK AND DIRECTORY OF STATE WATER RESOURCE AGENCIES, THE COUNCIL OF STATE GOVERNMENTS, CHICAGO, ILLINOIS, DECEMBER 1960, 73 PAGES; AND CORRESPONDENCE WITH STATE RESOURCE AGENCY DIRECTORS. THIS TABLE DOES NOT INCLUDE STATE STREAM POLLUTION AND GAME AND FISH AGENCIES OR ACTIVITIES.

FOOTNOTE 1/
C — CONSTRUCTS O — OPERATES
G — GRANTS L — LOANS
SCS — U.S. SOIL CONSERVATION SERVICE

collect hydrologic information. For example, all of the states have established cooperative programs on a matching fund basis with the United States Geological Survey (USGS) for investigation of ground and surface water resources. Many of these investigations are not conducted solely for flood-damage prevention purposes but they do provide information on quantities and variations of flow for selected streams and other useful data necessary to solve flood problems.

Hydrologic Data

While all of the states have participated to some extent in collecting flood data, few of them have established policies and procedures for analyzing and publishing the information in useful form for the use of other state and local agencies and individuals concerned with flood problems. Instead, these data collecting agencies have tended to file the information which they have collected for their specified program purposes where presumably it has been available to any individual or agency that requested a "file copy" or information from reports on file. In most instances however, these data are in a form which is useful only to trained hydrologic engineers or other water resource agency personnel. Until recently most Federal agencies have treated their hydrologic data in a similar fashion.

Thus a contributing factor to the continuing encroachments into flood plains has been the fact that flood data have not been readily available in a form which will help government officials and private developers to understand the location, magnitude, and frequency of future floods and to relate these data to specific projects and to general community development decisions. However, two recent developments in Federal-state

cooperation in distributing and interpreting flood data can provide some useful guidelines for future state action in this connection.

Cooperative Program in the Tennessee Valley. In 1952 representatives of the Tennessee Valley Authority and the state planning agencies in the Valley states participated in a series of conferences to determine how the states and TVA could encourage and assist cities and counties to take responsible action to solve flood problems.

These conferences resulted in general agreement on two basic points: (1) the localities needed hydrologic information in usable form that could be readily understood by local officials, and (2) the local governments needed assistance in applying these data to all aspects of their local planning programs. The first of these points is discussed here.

Since TVA had been collecting data on rainfall, streamflow, flood heights and other information in connection with the design and operation of its dams and reservoirs, it was agreed to make such information available through the state planning agencies through a series of local flood reports.

The TVA reports differ from the usual flood control reports in that they do not propose or suggest solutions to flood problems. The reports which are prepared only upon request of the local and state officials present in simple, non-technical language a history of past floods in the locality and show the area inundated, flood heights, velocities, valley cross sections, and high water profiles for several of the greatest floods known in the locality. The reports also provide information on floods that might be reasonably expected in the future based on a study of the history of the greatest storms which have occurred locally (Regional Flood)

and those which have occurred over a much larger area (Maximum Probable Flood). These projections place the past flood record in its proper perspective.

The flood reports are made available to the state planning agencies and through them to the local planning agencies. The local planning agencies are furnished sufficient copies for distribution to local officials, municipal and county operating departments, construction firms, banks, newspapers, and other organizations and individuals interested in community development. The state planning agency also makes copies available to other state agencies such as the state highway department and the industrial development agency, whose activities are affected by flood problems. TVA makes copies available to the Federal Housing Administration, Housing and Home Finance Agency, Public Housing Administration, and the Veterans Administration for use in reviewing applications for loans or grants for private or public housing projects in areas subject to flooding, and to other Federal agencies (4).

In the Tennessee Valley more than twenty-five cities which have received these reports have already included flood plain provisions in their zoning ordinances and subdivision regulations. Several other communities have used the data contained in the flood reports in the design and location of schools, recreation areas, highways, and sewerage systems. One city, Cleveland, shifted the proposed location of a high school building to higher ground and used the flood-prone area for a school playground.

TVA estimates that nearly 150 communities in the Tennessee Valley have flood problems and have need of these studies. Flood studies had been completed for 93 of these communities by April 1962. In addition,

nine were scheduled for completion by the end of 1962. See Fig. 2.

The success of this program stimulated TVA to recommend to Congress a six-point program for reducing the national flood-damage potential (5). One of the TVA recommendations was that appropriate Federal agencies be authorized, where such authorization was necessary, to prepare upon request local flood studies which would describe and analyze the local flood situation. Other recommendations suggested that a national flood-damage prevention policy should be developed which would encourage State and local governments to (1) prevent the unnecessary spread of buildings and other improvements into flood plains by establishment of land use controls, and (2) initiate the develop plans and programs for local flood-damage abatement through construction of protective works. TVA also suggested that State and local governments be required to adopt and administer flood-plain zoning and other such controls as might be needed to prevent development in flood plains as a prerequisite to Federal contributions to local flood-protective works. The proposed policy also recommended that Federal agencies having responsibility for site selection or financing of physical structures observe local flood-plain zoning and other standards in carrying out their responsibilities, and in cities without land-use controls, but subject to flood damage, require establishment of such controls before Federal programs are executed.

Soon after this recommendation, the 86th Congress passed Public Law 86-645, authorizing the Corps of Engineers to compile and disseminate information on floods and flood damages and to provide engineering advice to local interests when requested by them through a state or a responsible governmental agency. This puts into effect part of TVA's recommendations

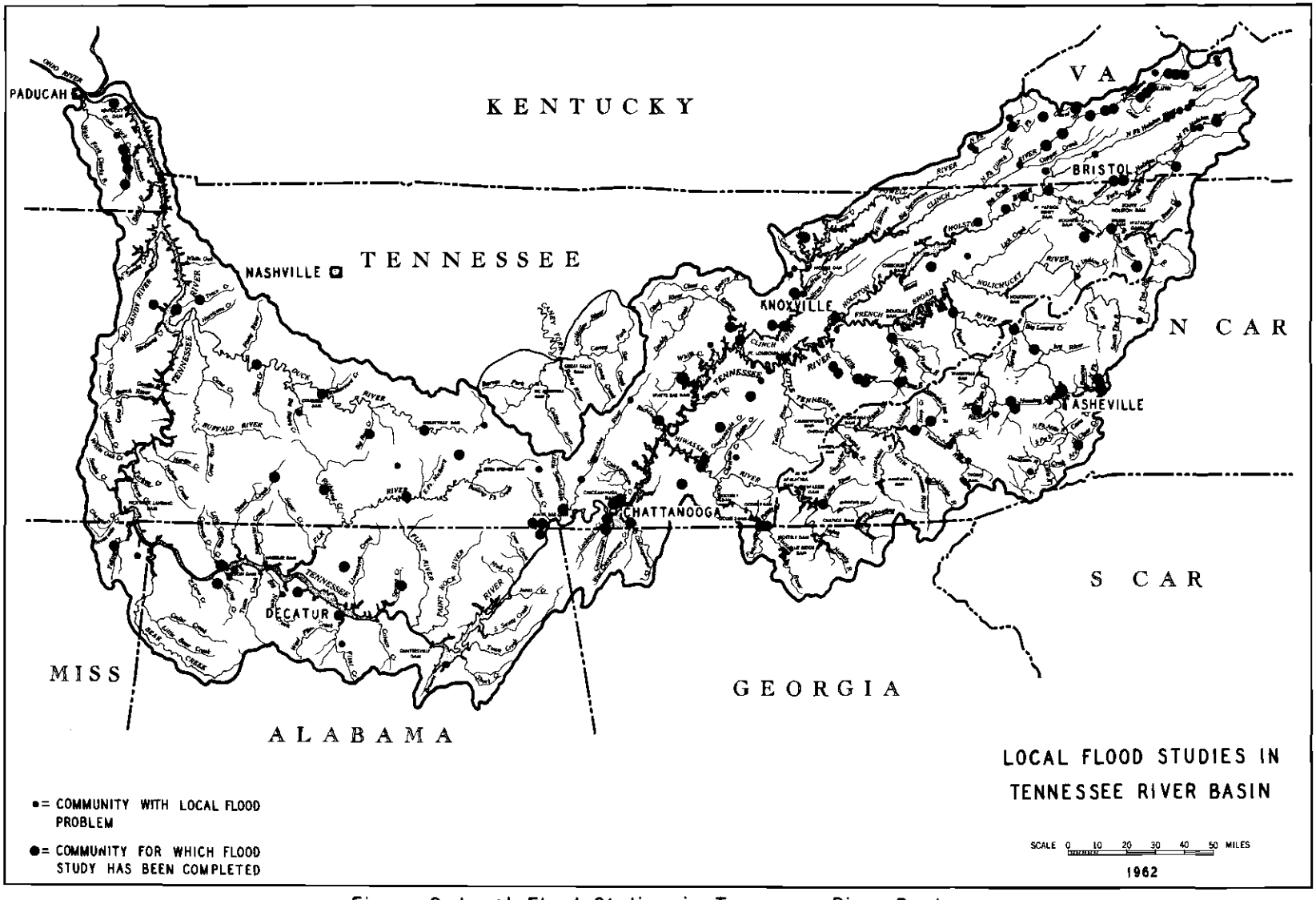

Figure 2. Local Flood Studies in Tennessee River Basin.

for a national program and enables the Corps to provide the same kind of assistance to communities throughout the entire nation that communities within the Tennessee Valley have been receiving.

At the request of the Corps of Engineers, each governor has designated a state agency to coordinate the state interests with the interests of the Corps of Engineers in this program. The governors of two states, Tennessee and Maryland, designated the state planning agency as the coordinating agency. Most of the other states have designated water resource agencies or natural resource and conservation agencies.

The Corps of Engineers manual EM 1165-2-111, Flood Plain Information Studies, outlines the data and type of report the Corps is making available at the request of local communities and cities and the states. It also outlines the technical guidance and assistance available to the states and local governments.

Studies in many areas throughout the country were started late in 1961. The first studies will be completed and reports issued in the summer of 1962. As of April 1962, requests for 89 studies in 64 localities across the Nation had been approved and more than 50 were under way. This includes one or more studies in each of 22 states and Puerto Rico. Studies are normally scheduled for completion within 12 months after they are started. An even more encouraging fact is the Corps' plan to increase the number of studies to be made each year.

The U. S. Geological Survey (USGS) conducts certain flood study programs jointly with interested localities and states. Special maps showing areas inundated by large historical floods and giving a brief summary of historical flood data, including small-scale profile, are

prepared. This series of maps is designated "Hydrologic Investigations Atlas HA-..." The maps and data are a major share of the pertinent information that would be included in the historical section of local flood reports that the Corps of Engineers and TVA prepare.

Such programs are carried out within the traditional USGS framework on a 50-50 matching fund policy, whereby the locality or state concerned bears half the total cost. Whether or not USGS is authorized to finance wholly the preparation of these Hydrologic Atlas maps is not clear. The Corps of Engineers and TVA finance their flood studies 100 per cent, with the understanding that non-federal contributions will be in the form of the follow-up flood damage prevention planning. Such financing by those agencies is predicated on the long-range savings to the federal government being greater than the short-range savings of share-the-cost financing.

Educational Materials

Some states have recognized that in addition to the flood reports which local officials, private agencies, and developers need in making decisions about flood-plain use, there is also a need for widespread public understanding of the hazards of occupying flood plains. In fact, one of the recommendations of the 1958 National Conference on Flood Plain Regulation and Insurance was that "there ought to be a comprehensive national effort to let the citizens of major flood hazard areas know the precise risk they are running."

The following information is indicative of the efforts of some of the states in promoting public understanding of flood problems.

The Education Sub-Committee of the Nebraska Advisory Flood Control

Committee recommended in 1960 that a program of education in flood control, soil and water conservation be devised and a plan of action developed for carrying out the program (6). The Ohio Water Commission published and distributed thousands of copies of a 24-page pamphlet on "Floods - The Problem," designed to answer some of the popular misconceptions about flood problems. The New Jersey Department of Conservation and Economic Development, through its Division of Water Policy and Supply, published a circular in 1961, "Flood Damage Alleviation in New Jersey." This publication defined the over-all flood problem of the state and identified some of the steps required to develop a realistic flood-damage prevention program. The Tennessee State Planning Commission distributed hundreds of copies of "Flood Damage Prevention for Tennessee" to state, county, and local officials as well as to all planning commissions in the state in 1960. In 1962, following heavy rains in Tennessee, the Director of the State Planning Commission sent a reprint of an article on flood-damage prevention with the following transmittal to approximately one thousand city and county officials and planning commissions throughout the state:

> Recently flood conditions have occurred in almost every Tennessee community.
>
> We can't stop the rain, but we can hold down property damage and hazard to life by staying out of areas readily subject to flooding.
>
> Some local governments may have doubted that they had any legal powers in this field, but the attached article by a well-informed member of the Tennessee Bar shows how progress can be made.

This type of continuing education by the states, though valuable, is not yet as widespread as it should be.

Flood Control Activities

Since traditionally the Federal flood control programs have been

oriented toward dams, levees, and other protective works, the state concern and interest in flood protective works may have resulted from availability of Federal funds for these purposes and the Federal emphasis on protection. One state flood control and water usage agency reflected this attitude in its annual report for fiscal year 1961. The report indicated that the agency had taken full advantage of its good working relationships with the state delegation in Congress and with the U. S. Corps of Engineers and the Soil Conservation Service to launch an accelerated program of cooperation with them designed to expand their (Federal) programs of water resources development in the state and to assist in getting prompt authorizations and appropriations of funds to develop them. The program in this particular state would appear to be oriented more toward reliance on and promotion of Federal agency flood protection programs in the state than toward development of a joint state-Federal flood-damage prevention program that would include other measures for reducing or preventing flood damage.

State reliance upon protective works to solve flood problems is further demonstrated by the fact that eighteen of the twenty-seven states that have authorized agencies to prepare over-all water resource plans have limited such plans to flood protective works (see Table 1).

The states have performed two general functions in the development of flood protective works. They have reviewed Federal flood control project plans prior to final Federal approval and in a few instances they have constructed or have contributed funds for the construction of flood protective works. These two functions are described in the following section.

Review of Plans for Federal Flood-Control Projects

Federal agencies that construct flood-control projects include the Corps of Engineers and Soil Conservation Service on a nation-wide basis and the Bureau of Reclamation, and the Tennessee Valley Authority in more limited areas.

All of the states are involved in reviewing projects for one or more of these agencies. This is primarily because Federal procedures require such review for nearly all projects.

The process of review of Federal flood-control projects varies widely among the states. For example, the governors of Georgia and West Virginia forward Corps' project proposals to the assistant state attorney general where the review is for legal purposes only. In three states the state highway department is the major review agency for such projects. In these instances the major emphasis is on road relocation and bridge openings. In many other states the state water resource department or division is responsible for such review. In some states the governor may appoint a special committee to review a project; there is no set pattern of action.

In many of the states the review of Federal flood-control projects, at best, is perfunctory and cursory. There are three basic but interrelated reasons for this.

First of all the review generally is on a project-by-project basis, not preceded by review and approval of an over-all plan of which the project is a part.

Second, none of the states except Hawaii has developed a comprehensive state plan which outlines basic state developmental policies and which can serve as a frame of reference in evaluating the impact of the

project on state programs. In fact, in the absence of such a development plan reflecting state interests, an adequate review of the individual projects would seem to be a most difficult task.

Third, state agencies are not given sufficient time to make proper reviews. The Federal inter-agency coordination procedures for water resource projects not only require that plans for such projects be submitted to the Governors of the states concerned and to the Washington headquarters of the other Federal water resource agencies for review and comment prior to final approval of the project plans, but also require the governors to submit their comments within ninety days. This relatively short time for review and comments by states that do not have a comprehensive plan to guide water resource agencies and other affected agencies has frequently resulted in inadequate review and "rubber stamp approval" of Federal flood-control project plans.

In recognition of this problem the Third Annual Meeting of the Interstate Conference on Water Problems passed the following resolution:

> WHEREAS, the Flood Control Act of 1944 provides that state comments on Corps of Engineer and Bureau of Reclamation project reports must be submitted within ninety days after receipt of such reports by each affected state; and
>
> WHEREAS, projects reports on which state comments pursuant to the Flood Control Act of 1944 are to be submitted have become more complicated; and
>
> WHEREAS, an increasing number of basin-wide plans encourage the submission of groups of projects for comment at the same time or as part of a coordinated undertaking; and
>
> WHEREAS, the present procedures and time allowances for the submission of state comments are predicated upon a simpler type of project analysis than is now appropriate in many instances:
>
> NOW, THEREFORE, BE IT RESOLVED by the Third Annual Interstate Conference on Water Problems that consideration be given by Congress

> to a revision of the procedures under which state comments are submitted, with a view to providing the legal and administrative authority for granting reasonable extensions of time for submitting such comments when requested by an affected state (7).

In many instances a cursory review of Federal flood-control projects by the governors and their staffs before final approval would be adequate if the state agencies affected by such project had worked cooperatively with Federal agency personnel in the preliminary field investigations and other studies during the period the project was being planned. However, where state agencies have not participated in the project planning and have not developed a statewide comprehensive plan, a cursory review (which is all that could be expected in a 90-day period) cannot provide an adequate opportunity for sound appraisal of the projects' impact on the various water resource and land use programs of the state.

In the absence of strong state technical staffs, it is doubtful if state interests can be adequately represented regardless of the amount of time made available for review. The Nebraska Advisory Flood Control Committee commented aptly on this situation as follows:

> The resources available to the State of Nebraska for an attack on the flood problem are found in the planning staffs of the three Federal action agencies, the Corps of Engineers, the Bureau of Reclamation and the Soil Conservation Service, and in the staffs of the two data collection and interpretive agencies: the U. S. Geological Survey and the U. S. Weather Bureau. These agencies are equipped to make a broad approach to meeting the objectives of the state by collaboration and coordination with each other and with a strong state agency <u>if one were available to establish a priority system and a guide line for state objectives</u> (8). (Emphasis added.)

It would appear that many states have in effect relied on the processes of Federal interagency review to coordinate state water resource agency programs. Unfortunately, this Federal interagency review sometimes

does not occur until the project plans are submitted to the Washington headquarters of the agencies concerned. Such reviews must then be accomplished in ninety days.

Miller summarized the problem as follows:

> There are many Federal programs having some bearing on water and having direct or indirect bearing on floods, flood prevention, and in turn flood damage prevention. These are located in various Federal agencies which in turn are represented by decentralized offices in the several states and it is apparently inevitably in the nature of things that the various Federal programs are not fully coordinated and in some instances the Federal representatives are not even acquainted with each other. To the extent that this situation exists it is a prima facia argument for stepped up action and assumption of responsibility by the states in developing a state policy, state resources program, and constructive coordination by the state among the various state and Federal programs affecting its lands and in turn its people (9).

State Construction, Operation and Financing of Flood Control Projects

The states have assumed a relatively minor role in financing the construction or operation of flood-control works. The Federal Government assumes the entire cost of many flood-control projects. However, where improvements, levees, or adjustments to structures are provided for the benefit of local governments, the localities must provide the necessary lands, rights-of-way, and certain other costs. Six states--California, Florida, Illinois, Michigan, Pennsylvania, and Washington--contribute funds to localities to help pay the local contribution and some of them construct state facilities. In Washington the state flood control agency enters into formal contracts with the Federal Government and contributes funds directly to it for flood-control projects. The other five states contribute such funds to the localities although in California the legislation specifically states that such appropriations are for the cost of

cooperation with the Federal Government on flood-control works (10).

Several of these six states also construct and operate flood-control structures. However, these construction activities are carried out in close cooperation with the major federal programs. Joint planning therefore is extremely important. In Pennsylvania, the Division of Flood Control of the Department of Forests and Water designs, constructs, operates and maintains dams, locks, and other works necessary to impound flood waters and conserve water supply (11). The Division of Design and Construction, California Department of Water Resources, designs and constructs water resource projects approved by the state. In Florida the Central and Southern Florida Flood Control District has constructed emergency flood-control works with state funds in cooperation with the Corps of Engineers. Similarly the Illinois Division of Waterways constructs, operates, and maintains flood and low-flow control projects.

Flood Plain Regulations

Authority to regulate land use, including the flood plains, resides in the states. The Federal Government does not have this authority except on Federally-owned land. Cities and counties do not have such authority unless it is granted to them by the state. Therefore, the states hold the key to responsible action for regulating flood-plain development.

With the exception of encroachment and floodway statutes none of the states, except Hawaii, have exercised their authority to regulate land use in flood plains. Instead, they have authorized cities and counties to adopt and enforce such regulations. Because of this, local planning is most important as a basis for any action to be taken.

Methods of regulating land use in flood plains include but are not limited to: encroachment or floodway statutes, zoning ordinances, subdivision regulations, building codes, urban renewal, and warning signs. These regulatory activities are described below.

Encroachment and Floodway Statutes

At least eight states--Connecticut, Indiana, Iowa, Kentucky, Massachusetts, New Jersey, Pennsylvania, and Washington--have enacted encroachment or floodway statutes (12). The basic intent of these laws is to prevent encroachments upon or obstructions in the stream channels that would restrict their width or otherwise increase flood heights and velocities. Enforcement of these statutes and their effectiveness have varied.

In evaluating the encroachment and floodway statutes and the programs to carry them out, Murphy (13) indicated that most of the states do not have a satisfactory basis for informing the public ahead of time that any special permit is required to build in a specially designated area. In most of these states, encroachment or floodway boundaries have not been established in the field and in some cases individual applicants must determine such lines in the field. Murphy indicated that the lack of definite lines in the field, permissive language in the statutes such as "the Commission may" instead of "the Commission shall," and inadequate administration of the statutes have tended to weaken these programs.

The Iowa Natural Resources Council published a Procedural Guide in September 1961 outlining the steps to be followed in processing applications for approval of construction on floodways for flood control or other purposes (14). This guide meets one of the needs suggested by Murphy for

informing the public about requirements for construction in established floodways.

Zoning Ordinances

All of the states have either passed general enabling legislation for zoning or have provided such authority through constitutional amendments or by special legislative acts (see Table 2). Such legislation gives cities and, in some cases counties, the authority to zone all of the territory within their jurisdiction including areas subject to flooding.

In order to do an effective job in adopting and enforcing zoning in flood hazard areas, many cities and counties need more than general zoning enabling legislation. They need assistance in securing flood data and applying it to specific situations. Many small cities do not have and cannot afford to employ competent professional and technical personnel to help them relate the flood situation to development problems and to prepare suitable zoning provisions to guide and control land use in flood plains.

Several states in the Tennessee Valley and elsewhere have provided flood data to local officials and planning commissions and have also provided professional personnel to assist them in their general planning, including zoning provisions for flood hazard areas. Some of these programs will be described more fully in the section on planning.

Cities and counties frequently need to take joint action to solve local flood problems. Some states have given extra territorial zoning powers to cities. Where these powers have not been given, cities must depend upon the county to regulate flood plain use outside the city. However, many counties do not have authority to adopt zoning regulations

and many who do have such authority have not used it. In such instances state action would seem to be necessary either to give counties authority to adopt zoning regulations or to encourage regional or state regulations for these unprotected areas. Klar commented on the need for regional zoning regulations as follows:

> Even with the very best of . . . zoning (of the flood plains), inevitably the streams which may give rise to such flooding in one community may pass through other communities first. If suitable measures are not taken upstream, the community which is conscientiously trying to do the best for its citizens may find itself thwarted in its program. This obviously speaks for regional planning--if not for regional zoning (15).

The Tennessee State Planning Commission has proposed enactment of a state flood plain zoning statute that would provide a temporary or interim solution to regional or "extra territorial" flood plain zoning problems (16).

To permit zoning of flood hazard areas currently unserved by local planning agencies this act would permit the state, through the State Planning Commission, to use its police power to promulgate zoning on flood plain areas. The proposed statute provides procedures for the certification of a zoning plan of a flood district by the State Planning Commission to the Secretary of State's office. A public hearing would be required in the county where the district is to be established. The act provides for a board of appeals to be appointed by the governor. Administration and enforcement of the zoning as provided for by the Act would be the responsibility of the office of a State Building Inspector within the State Planning Commission. This office would administer such zoning districts, issue necessary building permits, provide required inspections and enforce compliance with the zoning ordinance as passed.

The general concept outlined in this proposal merits consideration and study because it would seem to provide a reasonable basis for protecting areas not served by a local planning commission, or for encouraging local action.

State zoning regulations for areas not served by a planning commission would cease after a local planning commission has been established, local zoning regulations adopted and provisions made for a building inspector and an appeals board to administer and enforce such local zoning regulations.

Apparently a local government could adopt a zoning ordinance for the express purpose of avoiding state controls, because the proposed legislation does not establish any minimum zoning standards that the localities must meet before the state zoning regulations are terminated.

The provisions of this act do not apply where flood district zoning is already in effect or where a county court or chief legislative body of the municipality has already adopted a zoning resolution or ordinance with flood plain provisions.

The State of Hawaii has adopted in principle the concept of state zoning, one purpose of which is to establish conservation districts for, among other things, preventing floods and soil erosion.

The Hawaii State Legislature passed Act No. 187, in June 1961, authorizing the State to establish land use zones within the state for those uses to which they are best suited for the public welfare and to create a complementary tax assessment program that would encourage rather than penalize persons who would develop uses that are best suited for the public welfare.

The Act created a State Land Use Commission consisting of seven members. One member is appointed from each senatorial district and one member is appointed at large. The Director of the Department which is responsible for administering the Act and the Director of the Department of Planning and Research serve as ex-officio voting members.

The State Land Use Commission is directed by the Act to establish three major classes of uses to which all lands in the State shall be put: urban, agriculture, and conservation. The Commission shall group contigious land areas suitable for one of these three major uses into a district and designate it as an urban district, agricultural district, or conservation district.

The Act further provides that zoning powers are granted to counties and that the counties shall govern the specific zoning within the three types of districts except that areas may not be zoned for urban uses except in those districts that are designated as urban districts by the State Land Use Commission. The Act further provides that the Commission shall prepare and furnish each county with copies of classification maps for that county showing the district boundaries adopted in final form by the state.

The Commission is required by the Act to adopt in final form not later than twenty-four months from the effective date of the Act, regulations prescribing the permitted uses in the various classes of districts. The counties are responsible for determining the specific location of permitted uses within the districts.

The Act also provides that upon adoption of district boundaries and regulations, certified copies of the use classification maps showing the

district boundaries and the regulations shall be filled with the Department of Taxation. Thereafter the Department is required to give consideration to the use or uses that may be made of such lands in making assessments of property within the district.

Subdivision Regulations

Subdivision standards and regulations can provide an effective method of guiding development in flood plains by controlling the general location of subdivisions as well as their interior design to insure flood-free home sites.

Local governments need more complete and definite authority from the states to adopt and enforce subdivision regulations. All of the states have passed general enabling legislation, special legislation, or constitutional amendments authorizing cities to adopt and enforce subdivision regulations (see Table 2). In many states the cities have not been given adequate jurisdiction to enable them to regulate development of subdivisions in flood plains in their fringe areas. It is common knowledge that most subdivision activity has occurred outside corporate limits in the past fifteen years. Yet, "more than one-fourth of the states either restrict control to the city limits or make no mention of jurisdiction in their legislation" (17).

Although most states have authorized cities to extend their jurisdiction beyond corporate limits, many states have limited such jurisdiction to not more than three miles beyond corporate limits.

Where subdivisions in flood plains occur beyond municipal jurisdictions, county regulations are necessary. However, many states have not authorized counties to adopt subdivision regulations. In many states a

review of enabling legislation for subdivision regulations would seem to be indicated.

One of the major problems in administering subdivision controls in flood plain areas is securing adequate information about the flood characteristics in the area. The subdivider frequently does not know what areas are subject to flood nor how often and to what extent they are flooded. Local planning commissions need such information to effectively administer such regulations. However, as indicated previously, state and Federal agencies are usually the only agencies that have such data.

Local governments are responsible for enforcement of subdivision regulations including regulations in flood plains. Yet many cities do not have sufficient trained personnel to administer and enforce such regulations. Although responsibility for enforcement is local, the impact of poor enforcement is often regional and sometimes statewide.

Some states have developed programs for furnishing flood data and helping the localities administer and enforce their subdivision regulations. The Tennessee State Planning Commission has used data contained in flood studies prepared by the Tennessee Valley Authority in drafting recommendations for local subdivision regulations. Subdivision standards containing provisions for flood hazard areas have been adopted by several cities in the Tennessee Valley as a result of this cooperative program.

Some states have provided limited assistance to localities in enforcing subdivision standards. Such assistance has usually been provided as part of a local planning assistance program. These programs are described in the section on planning.

State health departments have adopted state subdivision regulations

for the primary purpose of insuring safe water supply and adequate methods of sewage disposal. Many of the subdivisions that have developed in the past two decades have relied on individual septic tanks for sewage disposal. Where septic tanks and their drainage fields have been located in areas subject to flooding, a serious public health hazard has been created.

The Alabama State Health Department recently adopted policies for approval of subdivisions in flood plains. These regulations provide that, "Approval cannot be given to any subdivision which lies wholly below the fifty-year flood stage. Where a subdivision is located partly above and partly below the fifty-year flood stage, the portion of the area above the flood stage may be approved, provided it satisfies all the requirements of the sanitation regulations and subdivision criteria" (18).

The state planning agencies and state health agencies apparently need to reach agreement on basic legislation and administrative regulations to control subdivision development. For example, Tennessee Planning Enabling Legislation defines a subdivision as the division of land into "two or more lots," whereas the Tennessee State Health Department standards define a subdivision as the division of land into "five or more lots." Thus the state health standards do not apply to the many small developers who subdivide a few lots at a time in areas not included in local planning jurisdictions.

Urban Renewal

Urban renewal projects provide a promising means of providing flood control measures and regulating land use in flood plains. Where urban

renewal areas include flood plains the plan for renewal and redevelopment can insure necessary flood-control measures and, where appropriate, arrange for open uses or other uses that will not be subject to undue flood damage.

Most of the states have passed enabling legislation for urban renewal. Some states have provided local planning assistance to communities concerned with urban renewal. Connecticut has gone a step further than most states by providing financial assistance to local governments for urban renewal.

The state recognized that some cities have had to forego Federally-aided urban renewal projects because of their financial inability to pay the local share of project costs. To help such cities, state legislation was adopted in June 1961 providing state loans to local governments that will enable them to participate in urban renewal projects including projects in flood hazard areas. This act provides that aid will be given to Federally-approved projects for up to one-half of the local share. The aid will be given in the form of a loan to be repaid in fifteen years from the real estate tax increment derived from the completed project. The annual payments on the loan shall be equal to one-third of the difference between the real estate taxes obtained during the year preceding the approval for planning by HHFA, and the taxes received each year after completion of the project. In some instances the loan may prove to be a grant if no tax increment is derived from the project because of the predominance of public uses, i.e., public open space in flood plains.

Building Financing

Public and private lending and loan guarantee agencies can influence land use in flood plains by refusing to approve or guarantee loans

for houses or subdivisions located in flood plains. While the Federal Housing Administration gives consideration to such flood problems, Murphy states that, "Their procedures, criteria, and staff appear to be inadequate to the task" (19).

One state, Tennessee, has assisted the FHA in reviewing requests for approval of subdivisions that occupy flood plains. The East Tennessee Office of the State Planning Commission furnished FHA with copies of preliminary plats of subdivisions which have been submitted to local planning commissions served by the state through its local planning assistance program. In addition, copies of the minutes of planning commissions meetings in which subdivision plats are reviewed are also forwarded to the FHA. The State Planning Commission staff and FHA land planners have made joint field reviews of subdivisions to help local developers in adjusting to flood problems.

The power to grant or withhold funds or set tax rates as a means of guiding and controlling land use in flood plains has been little used by the states. State agency appropriations and state grants to localities have been used to construct schools, highways, airports and many other public facilities which have sometimes been located in flood hazard areas. States could prevent such construction by withholding funds for facilities located in flood plains.

Warning Signs

A bill was introduced in the New Jersey General Assembly on May 1, 1961, to empower the Division of Water Policy and Supply in the Department of Conservation and Economic Development to delineate and mark flood hazard areas, and to coordinate effectively the development, dissemination, and

use of information on floods and flood damages that may be available (20).

The purpose of the bill is to empower the State to prepare maps showing areas subject to flooding and to mark such areas in the field so that public agencies, private organizations, and persons may be adequately alerted to the inherent danger to the safety, health, and general welfare involved in the improper development of flood hazard areas. A primary objective of this bill is to avoid pressure for increased governmental expenditures for the construction of flood control structures to protect the property unwisely located in flood hazard areas.

A similar provision is included in Section 2 (b) of the Interstate-Federal Compact for the Delaware River Basin.

Planning

The scope and content of planning programs related to flood-damage prevention vary widely among the states. These programs range from a fully documented, comprehensive, state-wide plan in one state to parts of a plan in other states and no plans in some states. Table 2 summarizes the extent of planning activity among the states.

State Planning

As mentioned previously only Hawaii, has prepared a comprehensive state plan which relates the programs and policies of all state agencies to the over-all objectives for the development of the state. The plan was drafted by the State Department of Planning and Research with cooperation from other agencies. Major functions of the department include research, formulation of long range development objectives including a

Table 2. Summary of Selected State Planning Activities and Legislation for State Planning and Local Land Use Controls

STATE	STATE HAS STATE PLANNING LEGISLATION?		STATE HAS AGENCY ACTIVELY CONCERNED WITH OVER-ALL STATE PLANNING?		STATE PLANNING AGENCY IS CONCERNED WITH FLOOD DAMAGE PREVENTION?		STATE PROVIDES LOCAL PLANNING ASSISTANCE?		STATE HAS LOCAL ZONING ENABLING LEGISLATION?				STATE HAS LOCAL SUBDIVISION CONTROL ENABLING LEGISLATION?			
									FOR CITIES		FOR COUNTIES		FOR CITIES		FOR COUNTIES	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
ALABAMA	●			●		●	●		●			●	●			●
ALASKA	●		●			●	●		○		⊖		○		⊖	
ARIZONA		●		●		●		●	●		●		●			●
ARKANSAS	●			●		●	●		○			●	●		●	
CALIFORNIA	●		●		●		●		●		●		●			●
COLORADO	●			●		●	●		●		●		●			●
CONNECTICUT	●		●		●		●		●		⊖		●		⊖	
DELAWARE	●			●		●	●		●		○			●	●	
FLORIDA	●			●		●	●		●		○			●		●
GEORGIA	●			●		●	●		●		●		●		●	
HAWAII	●		●		●		●		●		●		●		●	
IDAHO	●			●		●		●	●			●	●		●	
ILLINOIS	●		●		●		●		●		●		●			●
INDIANA	●			●		●	●		●		●		●		●	
IOWA		●		●		●	●		●		○		●			●
KANSAS		●		●		●		●	●		○		●		●	
KENTUCKY	●			●		●	●		●		●		●		●	
LOUISIANA	●			●		●	●		●		⊖		●		⊖	
MAINE	●		●			●	●		●			●	●			●
MARYLAND	●		●			●	●		●		●		●			●
MASSACHUSETTS	●		●			●	●		●			●	●			●
MICHIGAN		●		●		●	●		●		●		●			●
MINNESOTA	●			●		●	●		○		○		●			●
MISSISSIPPI	●			●		●	●		●		●		●			●
MISSOURI	●			●		●	●		●		○		●		●	
MONTANA	●			●		●	●		●			●	●			●
NEBRASKA		●		●		●	●		●		○		●			●
NEVADA	●			●		●	●		●		●		●			●
NEW HAMPSHIRE	●			●		●	●		●			●	●			●
NEW JERSEY	●		●		●		●		●			●	●			●
NEW MEXICO	●		●			●	●		●			●	●		●	
NEW YORK	●			●		●	●		●			●	●			●
NORTH CAROLINA	●			●		●	●		●		○		●			●
NORTH DAKOTA		●		●		●		●	●			●	●			●
OHIO	●			●		●	●		●		●		●			●
OKLAHOMA	●			●		●	●		●		○		●		●	
OREGON	●		●			●	●		●		●		●			●
PENNSYLVANIA	●		●		●		●		●		●		●		●	
RHODE ISLAND	●		●		●		●		●		⊖		●		⊖	
SOUTH CAROLINA	●			●		●		●	●		○		●		●	
SOUTH DAKOTA		●		●		●		●	●		●		●			●
TENNESSEE	●		●		●		●		●		●		●		●	
TEXAS		●		●		●	●		●			●	●			●
UTAH		●		●		●		●	●		●		●			●
VERMONT		●		●		●	●		●			●		●		●
VIRGINIA	●			●		●	●		●		●		●		●	
WASHINGTON	●			●		●	●		●		●		●		●	
WEST VIRGINIA	●			●		●	●		●			●	●			●
WISCONSIN	●		●		●		●		●		●		●			●
WYOMING	●			●		●		●	●			●	●		●	

LEGEND ○ CERTAIN CLASSES OF CITIES OR COUNTIES. ⊖ NO PROVISION FOR COUNTY REGULATIONS BUT BOROUGHS (ALASKA), PARISHES (LOUISIANA), OR TOWNS (CONNECTICUT & RHODE ISLAND) MAY ADOPT REGULATIONS.

SOURCE: INFORMATION ON STATE PLANNING LEGISLATION & STATE PLANNING AGENCIES OBTAINED FROM GRAY, A.J., "SURVEY OF STATE PLANNING AGENCIES, 1960," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, VOL. 27, NOV. 1961, P. 326.; INFORMATION ON STATE PLANNING AGENCIES CONCERNED WITH FLOOD DAMAGE PREVENTION OBTAINED BY CORRESPONDENCE WITH AGENCY DIRECTORS; INFORMATION ON STATE PROVIDING LOCAL PLANNING ASSISTANCE OBTAINED FROM "STATE AGENCY LISTINGS," OFFICE OF AREA DEVELOPMENT, U.S. DEPT. OF COMMERCE, SEPT. 1960, MIMEOGRAPHED; INFORMATION ON LOCAL ZONING ENABLING LEGISLATION OBTAINED FROM "COMPARATIVE DIGEST OF MUNICIPAL & COUNTY ZONING ENABLING STATUTES," HOUSING & HOME FINANCE AGENCY, 1952. SUPPLEMENTED BY 1962 DATA FOR ALA., ALASKA, GA., HAWAII, KY., MISS., TENN., & VA.; INFORMATION ON SUBDIVISION CONTROL ENABLING LEGISLATION OBTAINED FROM "AN ANALYSIS OF SUBDIVISION CONTROL LEGISLATION," INDIANA LAW JOURNAL, VOL. 28, 1952-53, PP. 544-566, SUPPLEMENTED BY 1962 DATA FOR ALA., ALASKA, GA., HAWAII, KY., MISS., TENN., & VA.

general plan, the preparation of a capital-improvement program, and provision of technical planning assistance to local units of government.

As mentioned earlier, the State of Hawaii has "adopted in principle the concept of state zoning, one purpose of which is to establish conservation districts for, among other things, erosion control and watershed protection" (21).

Seven states--California, Colorado, Hawaii, Minnesota, New Jersey, Tennessee, and Wisconsin--reported parts of a comprehensive plan to which state-wide water resource and flood-damage prevention plans could be related. For example, California has developed state-wide plans for highways, recreation, and water resources. New Jersey has developed state-wide plans for highways, transportation, recreation, water resources, and other activities.

Twenty-six states which have water resource agencies that prepare state-wide water resource plans did not report state-wide plans for other activities.

Where the states have not related water resource and flood damage prevention plans to other state policies and programs, the whole state development program including all of those activities affecting basic state resources have suffered. For example, although the State of Florida has spent considerable sums of money for dikes and other flood-control works, the state has not passed general enabling legislation for subdivision regulations. Flood damage potential in these "protected" areas has continued to increase because these "protected" areas are still subject to development. In the event of overtopping or failure of the flood-control works such developments would be damaged. These conflicting state policies which authorize state funds for flood-control works yet refuse to enact general legislation authorizing counties

to control land use in flood plains are not unique to Florida. This development in partially protected areas is only a part of the over-all resources problem.

In central and southern Florida early efforts to drain the Everglades for agricultural purposes and to dike the flood waters of Lake Okeechobee resulted in serious dislocations in the balance of water and soil resources. The uncoordinated drainage and levee projects resulted in lowered water tables and salt water intrusion in some of the coastal areas. It was found that structures designed to drain certain areas and protect them in time of flood were also depriving them of necessary moisture in other periods. The peaty organic soils of the Everglades dried out and thousands of acres caught fire or oxidized, and the rich much was lost and consumed forever. This combination of factors plus disastrous floods and hurricane winds in 1947 focused attention on the need for a comprehensive approach to the water problems of the region.

Many examples could be cited where proposed areas for future development of multi-purpose reservoirs had to be abandoned because of the development of subdivisions, highways, steam power plants, and other land uses which have made land acquisition costs prohibitive and impractical. In many instances such reservoir sites might have been saved if the states and local jurisdictions in which the projects were to be developed had cooperated in the preparation and implementation of local and state plans which recognized the need for the reservoir projects.

Many state programs have an impact on land use in flood plains. Because of this such programs need to be administered with reference to statewide policies for flood-damage prevention and within a framework of comprehensive state development plans. For example, state highway

departments generate a demand for land use every time they build or plan a road. When such roads pass through or near flood plains, they encourage flood plain development. If state highway departments could be encouraged to recognize their role in guiding and controlling land use in flood plains as part of an over-all state policy for flood damage prevention, they might limit access to such roads or design them in a manner that would discourage development in the flood plains.

In many cases where highway departments have relied on water resource agencies to supply hydrologic data necessary for the design of bridges and culverts, the hydrologic data have been based on existing watershed characteristics of open lands. These watersheds have subsequently been altered by intensive urban development which the water resource agencies had failed to anticipate. As a result the designs of bridge openings and culverts have sometimes been inadequate to pass flood flows and flood heights have been increased.

Effective cooperation between the state highway departments, state water resource agencies, and state planning agencies in implementing over-all flood-damage prevention policies would enable each agency to make a maximum contribution to the solution of flood problems. The planning agencies could provide information on changing population and land use patterns as a guide to the highway departments and the water resource agencies in adjusting their plans to accommodate future characteristics of watersheds and geographic areas.

Recent changes in emphasis in the planning programs of several states reflect a trend toward greater recognition of the need for developing and coordinating state-wide plans and programs including water

resource plans. The Survey of State Planning Agencies, 1960, conducted by the American Institute of Planners, indicated that the Pennsylvania State Planning Board is in the process of developing a program centered on public-works programming, research on population trends and distribution, river basin development, and land-use guidance at highway interchanges (22).

In New Jersey the Bureau of Planning has enlarged its state planning staff. The Bureau has three functions: (1) to provide technical assistance to localities, (2) to improve coordination among the state agencies in planning long-range state development programs, and (3) to aid the office of the Commissioner of Conservation and Economic Development in integrating the operations of the department. These programs should provide a better opportunity for more effective planning for the solution of flood problems.

In Tennessee greater emphasis is being given to broad state planning studies concerned with water resource development and flood problems. The State Planning Commission has recently prepared a report and recommendations for a state-wide program for flood-damage prevention, (23) a report and recommendations for a state watershed policy and program, (24) and a proposed plan for state and local action in adjusting governmental programs to a new multi-purpose reservoir being constructed by the Tennessee Valley Authority (25).

Local Planning Assistance

Local planning assistance programs provide the states another means of reducing flood damage. These programs can assist local governmental units in appraising their flood problems and deciding how the communities' developmental plans can be adjusted to these flood problems.

Some states have provided such assistance by employing state personnel who work with local officials. Other states have merely served as certifying agents for contracts between private consultants and communities in conducting planning studies financed in part with federal matching funds under Section 701 of the Housing Act of 1954.

Programs of local planning assistance and provision of technical information have constituted the major activity of some state planning agencies in connection with flood problems. Many state water resource agencies have provided flood data and engineering reports to localities concerned with flood problems. Table 2 shows that forty-two states provide some form of local planning assistance that can be related to flood problems.

One of the most successful programs of assistance to localities in guiding and controlling land use in flood plains is provided by the Tennessee State Planning Commission. The state contracts with local governments to provide planning personnel who assist in the preparation of comprehensive plans for community development. These plans include recommendations for development of land uses in flood plains which are compatible with the over-all land use requirements of the community and with the need for an open floodway. The state personnel assist the localities in using flood data, furnished by the Tennessee Valley Authority or the Corps of Engineers, to develop proposals for land use in flood plains and in drafting suggested policies to guide such land use. To date the state has assisted more than a score of localities in preparing plans to adjust to local flood problems by serving as staff to the mayors, city managers, and/or planning commissions and working with heads of local departments.

The program has been successful in several communities. For example, in one city local officials were assisted by the State Planning Commission and TVA personnel in selecting a flood-free site for a school that was scheduled for construction in a flood plain. In another city construction of a commercial building was stopped until the foundation walls could be replaced by concrete piers to minimize restriction of flood flows. In several instances, state staffs have assisted local planning agencies in preventing subdivision of known flood areas.

CHAPTER III

ADMINISTRATION OF STATE PROGRAMS TO GUIDE LAND USE IN FLOOD PLAINS

Chapter II indicated that comprehensive state and local planning is essential to the development of effective programs to guide land use in flood plains. Efficient administration is an equally important element of such programs.

Two major groups of state agencies have had primary responsibility for planning, developing, and administering programs that affect land use in flood plains. These are the water resource agencies and the planning agencies. Other agencies such as highway and public works departments have played important but secondary roles.

This chapter will describe the administration of these programs and the relationships which have been established between the water resource agencies and the planning agencies.

Water Resource Agencies

State water resource programs related to flood problems have been administered in a variety of ways. Four apparent patterns of administration are (1) a single state department or agency which is responsible for all of the major water resource functions, (2) two or more independent state agencies working cooperatively on a formal or informal basis, (3) intrastate regional organizations, and (4) interstate compacts. These administrative patterns are reviewed here.

Administration by a Single State Agency

Fifteen states have developed water resource programs in which a single agency has been given over-all responsibility and authority for administration of state water resource functions including those related to flood problems (see Table 1). New Jersey provides a good example of this type of organization.

The State of New Jersey has assigned responsibility for the planning, development, and operation of all state water resource programs as well as for relations with the Federal water agencies to the Department of Conservation and Economic Development. The Department administers these programs through the Division of Water Policy and Supply, the Division of State and Regional Planning, the Division of Fish and Game, and the Division of Shell Fisheries. The functions of the first two divisions which have primary responsibility for flood-damage prevention are described below.

The Division of Water Policy and Supply is responsible for statewide planning for the use and regulation of surface and ground water resources and flood control and for the development of a three-fold, long-range, statewide water resource development program: (1) to insure the availability of reservoir sites when required for the development of surface water resources, (2) to assure the protection and orderly development of the state's ground water resources, and (3) to acquire, design, construct, maintain, and operate the reservoir storage facilities to meet flood control needs and current deficiencies in developed water supplies.

The Division of State and Regional Planning is responsible for the preparation of over-all state development plans and policies. In this capacity it works not only with other Divisions of the Department but also

coordinates the work of all state departments as they relate to state development. In addition the Division assists counties and municipalities in land use planning and zoning matters including the relationship of plans to the local flood situation. It also administers the shoreline and channel improvement programs.

The administration of all of these water resource activities in New Jersey by one agency which is responsible for representing the state in negotiations with local and Federal water resource agencies has enabled the state to develop an effective over-all water resources program including flood damage prevention and to coordinate state activities with those of the Federal and local governments.

Several other states administer water resource programs through one agency but of these only Wisconsin has state planning as a function of the agency that administers water resource development.

In Pennsylvania water resource programs including flood control activities are administered by the Department of Forests and Waters through its Divisions of Flood Control, Dams and Encroachments, and Hydrography, and the Water and Power Resources Board.

California administers water resource programs through the Division of Resources Planning and the Division of Design and Construction in the Department of Water Resources. The Department is generally responsible for planning, construction, and maintenance of flood control works authorized by the state legislature. It also coordinates state, local, and Federal flood control efforts and reallocates funds to local agencies for costs of lands, easements, and rights of way, including relocation of roads and utilities of authorized Federal flood control projects.

The Department reviews the construction activities of other state agencies, such as the Division of Highways, from the standpoint of flood hazards.

In Ohio, water resource activities are coordinated through the Department of Natural Resources, and in Washington they are administered by the Department of Conservation. Although the above-mentioned organizations vary somewhat in structure due to differences in the administrative organizations of the states, their purposes and objectives are similar in most respects.

Administration by Two or More State Agencies

Most of the states have assigned responsibilities for water resource activities related to flood-damage prevention to two or more separate agencies with special water resource functions. Table 1 shows that in most cases where the states have two or more separate agencies to administer water resource programs the state program has been weak and has generally been limited to data collection and project review.

There are exceptions to this pattern. In a few states there are successful and comprehensive programs even though several agencies share responsibility. For example, in Illinois there are four water agencies, but one of them--the Water Resources and Flood Control Board--provides for coordination among the various agencies dealing with water resources and is responsible for making general water policy recommendations. In Iowa there are three water agencies, but the Natural Resources Council has responsibility for establishing a comprehensive state-wide program of flood control, conservation, and use of the water resources of the state. The Council also supervises flood control activities of municipalities, state and Federal agencies, and other groups, and assists in establishing flood plain regulations within the state.

Intra-State or Regional Organizations

Sometimes the problems of flood-damage prevention transcend city and county boundaries but are still intra-state in character. In such situations local governments cannot solve flood problems or develop comprehensive water resource plans without an effective framework through which they can operate.

Two types of regional or intra-state organizations have been developed which offer useful experience in guiding land use in flood plains. These include the Muskingum (Ohio) Watershed Conservancy District, which has adopted a comprehensive flood damage prevention program that includes land use regulations and flood control structures, and the Central and Southern Florida Flood Control District, which relies on flood control structures and does not have land use regulations.

Muskingum Watershed Conservancy District. The Muskingum watershed is entirely within a single state, Ohio, and its jurisdiction is intra-state. There are numerous intra-state drainage areas which may find guidance from the Muskingum experience (26).

The Muskingum Watershed Conservancy District (MWCD) was established in 1937 as a corporate subdivision of the state under the Conservancy Act of Ohio (27). The original Conservancy Act passed in 1914 was directed largely to the problem of flood control. However, the Act was broadened in 1937 to provide for a comprehensive approach to the basin's many interrelated water problems.

The District is responsible for preparing the plans for the watershed, publishing and hearing official objections to the plan, adopting the official plan, and recommending its adoption by a conservancy court

consisting of the judges of the Court of Common Pleas of each county included in whole or in part within the District. The District is also responsible for constructing, maintaining, and operating all works or improvements necessary to complete, operate, and protect the plan. It is empowered to purchase or lease land or other property; exercise the right of eminent domain; contract with private individuals, private or public corporations, or the Federal Government for cooperation or assistance in constructing, maintaining, using, and operating the works of the District, or for making surveys and investigations or reports on the waters of the district; levy taxes and benefit-assessments; and issue bonds in anticipation of collections thereof.

Originally the MWCD was established to administer a comprehensive watershed development program. It set up its own staff and started to carry out a comprehensive program in which flood control activities were to be coordinated with land control and land management activities. The District was originally financed in part by local funds. The District program developed support from local governmental units for both corrective and preventive aspects of flood damage reduction.

Following the Flood Control Act of 1936 as amended in 1939 when the Federal Government assumed major responsibility for flood control, the District was not able to maintain its broad approach to flood-damage prevention because of the heavy emphasis on control works. The MWCD's role was reduced to that of reservoir property management. "The same forces which urged MWCD to turn flood control over to the Corps of Engineers urged the MWCD's board of directors to adopt an unwritten policy of 'self-support'" (28). As a result the recreation and forestry activities which

cannot be made self supporting have been neglected. The approach of the MWCD in dealing with the local governmental units and the Federal Government provides useful experience in the administration of intra-state water agencies that attempt to develop a comprehensive regional flood-damage prevention program.

Central and Southern Florida Flood Control District. Prior to 1948 central and southern Florida experienced a series of disasters resulting from hurricanes, floods, uncoordinated drainage plans, droughts, and salt water intrusion into ground water supplies of coastal cities which caused Federal, state, and local officials to seek new solutions to the water resource problems of the area. The unrelated activities of single purpose Federal, state, and local agencies concerned with drainage, flood protection, navigation, and agricultural programs in this section of the state had not only failed to solve flood problems but had caused serious dislocations in the balance of surface and ground water supplies and oxidation of thousands of acres of organic soil. Out of these years of disaster and economic dislocation came the realization that a single comprehensive plan was needed for the development of the entire area.

Accordingly, representatives of many local agencies concerned with flood control, water, and soil conservation requested the Corps of Engineers to work with state and local interests in collecting data and holding a series of public hearings to determine the desires of the many local interests and prepare recommendations for a program.

As a result, the Corps of Engineers recommended a comprehensive program for the area for flood control, drainage, and related purposes. The proposed program called for heavy state responsibility and establishment

of a single regional agency with which the Federal Government could work on all matters of local cooperation. It also provided that as the Corps completed individual projects it would turn them over to the regional agency for maintenance and operation. The program was approved by the Governor of Florida and by Congress in 1948.

Chapter 378, Florida Statutes of 1949, provided general enabling legislation authorizing the organization of flood control districts to cooperate with the United States Government on authorized water resource projects. This law also provided for establishment of a flood control account in the general revenue fund to provide state financial assistance to districts created under the law.

The above-mentioned law provides that any district formed under it shall be directed by a Governing Board serving three-year staggered terms, appointed by the governor, subject to confirmation by the Senate.

Under the provisions of this law the 1949 Legislature created the Central and Southern Florida Flood Control District, established its boundaries to include all or part of 17 counties and levied an initial tax on property within the District. The primary operational obligations of the District include acquisition of rights-of-way, relocation of roads and utilities, and maintenance of all works except those for navigation and discharge of water from conservation areas. The Governing Board of the District has employed an Executive Secretary and other staff to carry out the Board's instructions in accordance with official district policies.

The District has established County Advisory Committees to secure more effective cooperation of County Commissioners, subdrainage district

officials, and landowners. Cooperation of the County Commissioners has enabled the District to relate District levees and county roads in a mutually beneficial system.

The District has attempted to maintain water levels throughout the region in keeping with sound conservation practices. In this connection it has cooperated with the Florida Game and Fresh Water Fish Commission and the U. S. Fish and Wildlife Service in determining the requirements for wildlife conservation and management in relation to flood control.

The program has been only partially successful because the District has relied solely on flood-control works and has not been able to regulate land use in the areas subject to flood damage.

Interstate Compacts

In several states where flood problems cross state lines, increased attention is being given to the interstate compact as an administrative device for finding solutions to over-all water resource and flood control problems. Two outstanding programs are the Delaware River Basin Compact and the Colorado River Basin Compact. The Delaware program is described here.

The problem of governmental organization for the administration of the Delaware River Basin has been a matter of concern to the states of Delaware, New Jersey, New York and Pennsylvania for many years. In 1955 the Governors of these four states and the Mayors of New York City and Philadelphia established the Delaware River Basin Advisory Committee to review the water resource problems of the Basin and adjacent areas. The Committee is comprised of one appointee of each of the four Governors and the two Mayors. The Committee helped a number of citizens to establish

the Water Research Foundation for the Delaware River Basin, a non-profit private corporation. In 1959 the Foundation completed a comprehensive study of the water problems of the Delaware Basin and recommended that the four Basin states and the Federal government establish a new central agency to give unified administration to the Basin's water resources.

As a result of this recommendation the Governors of the four Basin states and the Mayors of New York City and Philadelphia requested the Delaware River Basin Advisory Committee to prepare a proposed draft of legislation for the creation of a basin agency by interstate-Federal compact. This proposed legislation was drafted and was subsequently approved by the Basin states and the Congress.

House Joint Resolution 225, 87th Congress, first session, passed by the House of Representatives June 29, 1961, to grant the consent of Congress to the Delaware River Basin Compact, stated "The water resources of the basin are presently subject to the duplicating, overlapping, and uncoordinated administration of some 43 state agencies, 14 interstate agencies and 19 federal agencies which exercise a multiplicity of powers and duties resulting in a splintering of authority and responsibilities." The resolution approved the creation of the Delaware River Basin Compact between the Federal Government, the States of Delaware, New Jersey, New York, and the Commonwealth of Pennsylvania. In this instance the Federal Government is a full party to the compact as distinguished from a solely interstate compact where the Federal Government merely gives consent. The principal purpose of the Compact is to create an administrative agency which can act for the five signatory parties in the planning, control, and development of the water resources of the Delaware River Basin. The

governing body for the Compact is a five-member Commission composed of the governors of the four states and one person appointed by the President of the United States. Each member appoints an alternate with full power to act in the absence of the member. The duration of the compact is limited to 100 years subject to automatic renewal. Principal duties and powers of the Commission are:

1. Formulate, adopt, and keep current a comprehensive plan for the development of the water resources of the Basin and insure that all new projects or facilities having a substantial effect upon the waters of the Basin are carried out in conformance with the comprehensive plan, and

2. By working with and through existing federal, state, and local agencies--or directly when necessary--plan, construct, operate, and maintain dams, reservoirs and other facilities and conduct other programs for the purposes of:

    (1) flood damage prevention and reduction
    (2) water quality improvement
    (3) municipal, industrial and agricultural water supply
    (4) recreation and fish and wildlife improvement
    (5) hydroelectric power generation
    (6) soil conservation, forestation and watershed management (29).

The Compact provides for joint financing of the program by appropriations from all five signatory parties. The Commission has no taxing powers and cannot pledge the credit of the signatory powers, but it may borrow money, issue revenue bonds, make reasonable charges for products and services, and levy special assessments upon water users who receive specific benefits from streamflow regulation provided by the Commission.

Comprehensive statewide water resource plans by all of the member states would seem to offer an effective basis for state participation in the Compact. New York, New Jersey, and Pennsylvania have authorized their

water resource agencies to prepare such plans. Delaware has not reported such authorization (30).

Planning Agencies

Since the location of state planning agencies within the framework of state government has a definite impact on the scope and effectiveness of state planning programs, this section of the study will review the methods of organization and administration that have been established for state planning.

The states have participated in the development of two major classifications of planning programs that have been concerned directly or indirectly with state efforts to guide or control land use in flood plains. These are the programs of state planning agencies and state sponsored or authorized regional planning organizations. The organization and administration of these planning programs are described in this section.

State Planning Agencies

A survey of state planning agencies made in 1960 indicated that some of the states have given new emphasis to the state planning function in their reorganization plans and that "state planning in the United States may be entering a new phase of development" (31). The survey showed that some of the most comprehensive state planning programs which have been developed are in those states that have recently organized or reorganized their planning agencies and placed them in closer contact with the office of the governor.

However, the survey indicated that with few exceptions, which will be mentioned below, most of the state planning agencies are operated by

commissions or boards whose primary responsibility is in the field of economics or industrial development. The survey stated that where this situation exists attention is given to local planning assistance, and the state planning function is virtually eliminated. At the present time only 15 states have agencies which are actively concerned with over-all state planning (see Table 2).

As mentioned earlier, Hawaii is the only state that has established a separate state planning agency having a director with cabinet status. The Department of Planning and Research is a staff agency whose functions are broadly conceived as encompassing the areas of research, the formulation of long-range development objectives including a general plan, the preparation of a capital improvement program, and provision for technical planning assistance to local units of government (32).

The Department of Planning and Research completed a General Plan of the State of Hawaii in November 1960 and transmitted it to the governor. In forwarding the plan to the Legislature in 1961 the governor indicated that the General Plan is, in effect, a statement of the general development policy of the Islands. It contains a statement of the State's objectives and ways of reaching them through government and private action (33).

The following procedures have been adopted for the preparation or revision of the Hawaii Plan. At the state level, the Plan is prepared by the State Planning Office and submitted to the Governor, who in turn recommends it to the Legislature. The Legislature in considering the plan may by resolution adopt it as the general development policy of the State in its original form or with such amendments as they may desire. Adoption

by the Legislature indicates that from a policy point of view there is established a common set of development objectives and approval in principle of the broad land and economic development policies stated in the plan (34).

The Director of the Hawaii State Planning Office reported that while the staff of his agency had served as authors of the plan, many state and local agencies had participated in its preparation (35).

Three other states have recently transferred their state planning functions to the office of the governor or the executive department. Alaska has established a Division of State Planning within the office of the governor. In Pennsylvania the State Planning Board has been transferred from the Department of Commerce to the governor's office, and in Colorado a State Planning Division has been established in the Executive Department (36).

Four states--California, New Mexico, North Carolina, and Tennessee--have placed their state planning agencies in departments of administration and finance where they are part of a larger staff agency in the office of the governor (37).

Two states, New Jersey and Wisconsin, have established state planning agencies within resource development departments.

Regional Planning Agencies

In some states regional planning agencies have been sponsored or authorized as a means of carrying out state planning objectives. The regional planning programs in Connecticut and Illinois provide useful examples of this approach to state planning.

Connecticut has adopted a planning policy and a program to effectuate statewide planning through establishment of regional planning programs. A recent report of the Connecticut Development Commission indicated that, although its functions beyond promotion and advertising of the advantages of the state are limited, the Commission has established a Division of Planning whose primary function is to assist local governments in their programs of planning and zoning. Since the legislative powers to plan for and negulate development of land use are in the hands of local government, the Planning Division has attempted to implement statewide planning activities through its authorization to: define logical economic and planning regions in the state; promote the establishment of regional planning authorities within the defined regions; and render technical assistance to such planning authorities (38).

The Connecticut Development Commission reported that it also intends to provide technical assistance to regional planning authorities in the form of interregional coordination. In this role the Commission can coordinate the programs and activities of two or more regions and also serve in a coordinating capacity between the regional planning authorities and the various state agencies responsible for implementing particular elements and recommendations of the regional plan (39).

Although the Development Commission does not have specific authority for state planning it has engaged in a series of technical studies and fact collection on a statewide basis in order to determine the boundaries of planning regions. After the 1955 floods the Commission established planning regions whose boundaries coincided with major drainage basins for purposes of planning for flood-damage prevention. How-

ever, their experience showed that watershed boundaries were not adequate for the kind of over-all planning that was required. As a result the Commission has revised its policies to define regions that consist of those municipalities (in Connecticut all of the territory of the state is included within municipalities) whose economic, social, and cultural activities are oriented to the economy of an urban center and to which flood problems can be related.

After the Commission has made a final definition of a planning region, municipalities included in the region can join in the creation of a regional planning authority by adoption of an ordinance by the local legislative body. The authority can be created when municipalities in the region, having adopted the ordinance, total at least sixty per cent of the representation possible for all municipalities included in the defined region. The number of representatives for different size municipalities is defined in the enabling legislation.

The Development Commission indicated in a memorandum report, dated June 22, 1960, that it had made final determination of thirteen planning regions and tentative definition of one planning region. Five of the thirteen planning regions had established official planning authorities to serve their constituent local governments. The memorandum indicated that although most of the state has been included within the approved or tentative planning regions, several areas remain in which no definite action has been taken because no local interest has been expressed in regional planning or because regional orientation of certain municipalities is so weak or fractionalized as to make definition of a planning region difficult.

The regional planning authorities are required to prepare a regional plan of development and assist the planning commission of the member localities within the planning region. State enabling legislation for Connecticut provides:

> Each regional planning authority shall make a plan of development for its area of operation, showing its recommendations for the general use of the area including land use, principal highways and freeways, bridges, airports, parks.... The regional planning agency shall assist the planning commissions of the member towns, cities or boroughs in carrying out any regional plan or plans developed by such authority (40).

These regional planning agencies are authorities and as such they do not have any regulatory or taxing powers. They have only the "power of a good idea" (41).

The role of the State of Illinois in regional planning differs from that of Connecticut in that Illinois has limited its action primarily to establishing a regional planning commission. In 1957 the Governor of Illinois signed into law an act establishing the Northeastern Illinois Metropolitan Area Planning Commission to serve the six county area of metropolitan Chicago which includes 270 municipalities and over 900 governments in all.

The Commission is composed of 19 members, eight of whom are appointed by the Governor, five by the Mayor of Chicago, and one each by the Chairmen of the governing board of each of the six metropolitan counties (42). The Commission is dependent upon voluntary appropriations and contributions from the cities and counties in the area and from the state and private organizations and individuals.

The Commission has engaged in a series of metropolitan studies including population and employment projections. It has scheduled studies

for 1962 which will include problems related to Open Space, Transportation, Water Supply and Waste Disposal, and Flood Control and Drainage.

The Commission has provided planning assistance to 40 local governments and assisted them in achieving inter-governmental cooperation in solving flood problems.

The Commission is presently serving as the coordinating agency for the Northeastern Illinois Flood Hazard Mapping Project which the Commission conceived and initiated through its Technical Advisory Committee on Flood Control. This project provides for preparation of large-scale maps delineating the lands subject to periodic flooding. More than two-thirds of the six county metropolitan area is to be mapped. The project is to be financed and carried out over a five-year period by the six metropolitan counties with the U. S. Geological Survey participating on a matching funds basis.

State Water Resource Agency and Planning Agency Relationships

Many different patterns of administration and cooperation have been developed between state water resource agencies and state planning agencies in programs which affect land use in flood plains.

Hawaii has achieved coordination of all of its planning and resource development programs by (1) establishing a separate state planning department whose director is a member of the governor's cabinet and (2) adopting a comprehensive plan which incorporates broad policy statements for the guidance of all departments in relating their activities to the comprehensive development of the state.

Two states, New Jersey and Wisconsin, have developed close cooperation between the water resource and planning agencies by placing them in

the same department. In New Jersey the Department of Conservation and Economic Development is responsible for over-all supervision and administration of the Division of Water Policy and Supply and the Division of State and Regional Planning. The programs of these two agencies were described earlier in this chapter. In Wisconsin both functions are in the Department of Resource Development.

Pennsylvania has relied primarily on cross representation on boards and commissions as a means of achieving cooperation and coordination between the water resource and planning agencies. The agencies with major concern for planning and water resource development are the State Planning Board, the Bureau of Community Development of the Department of Commerce, the Department of Forests and Waters, the Interstate Commission on the Delaware River Basin, the Delaware River Basin Advisory Commission, and the Delaware River Basin Compact. The Executive Director of the State Planning Board (located in the office of the governor) reported that there is good coordination at both staff and policy-making levels since (1) both the Secretary of Forests and Waters and the Secretary of Commerce are members of the State Planning Board, (2) the Chairman of the State Planning Board is also Chairman of the Delaware River Basin Advisory Committee, and (3) the Executive Director of the State Planning Board is Chairman of the Interstate Commission on the Delaware River Basin.

The Secretary of the Department of Forests and Waters is an active participant in the programs of several agencies whose fields of interest include flood-damage prevention. In addition to being a member of the State Planning Board he is a member of the State Soil Conservation Commision, the Interstate Commission on the Delaware River Basin, the

Interstate Commission on the Potomac River Basin, and is Chairman of the Pennsylvania Water and Power Resources Board (43).

In some states relatively strong, well-staffed water resource agencies have been hindered in their efforts to develop comprehensive flood-damage prevention programs because of the lack of a strong state planning agency actively concerned with comprehensive statewide development policies including water resource development. In Ohio, for example, the Ohio Water Commission in the Department of Natural Resources is responsible for "coordinating the water programs in and of the state, including plans for water supply, flood control and flood plain zoning. It holds hearings; reviews plans; assists governmental agencies; makes studies; counsels with many agencies, public institutions and private interests; and recommends policy and legislation" (44). The Survey of State Planning Agencies, 1960, showed that Ohio had designated the Department of Industrial and Economic Development as the "state planning agency for 701 purposes." The Survey indicated that the designated state planning agency was not actively concerned with statewide planning problems including flood-damage prevention (45).

In this situation the absence of an active state planning agency concerned with comprehensive development would seem to limit the efforts of the Ohio Water Commission to coordinate plans for flood control, flood plain zoning, and to "resolve conflicts between user interests and geographic areas," and recommend policy and legislation. Development of over-all water resource plans including statewide plans for flood-damage prevention must necessarily be based in part on other planning studies which are beyond the scope and jurisdiction of a water resource agency.

Indiana provides a similar example. The Indiana Flood Control and Water Resources Commission has developed a comprehensive flood-damage prevention program without benefit of an active state planning agency to assist in providing a framework of statewide development policies to which flood-damage prevention programs can be related. Table 2 shows that Indiana does not have a state agency actively concerned with statewide planning.

In California, while the State Planning Office in the Department of Finance has been working toward the development of comprehensive land use policies, the absence of such policies to date has created serious problems for the water resource agencies. A recent study of this problem stated in part:

> In spite of the fact that the California Water Plan was approved in 1959, no action has yet been taken and no policy declared to set aside the lands that will be needed for reservoirs. As the state moves toward construction, land values will jump, and the taxpayer will suffer.
>
> No policy or plan has been developed to control the location of new highways and the improvement of old ones through the designated reservoir areas. Failure on the part of the state to coordinate highway and reservoir programs will cost either the taxpayer or the water users many additional millions of dollars.
>
> The Department of Water Resources is the agency that devised the California Water Plan (adopted by the Legislature in 1959). This plan projects a series of dams, reservoirs, aqueducts, canals and pipelines running almost the length of California, to meet the growing demands from various parts of the state for more water and flood control.
>
> Passage of the $1.75 million bond issue in 1960 now places the department in the construction business: It is responsible for building some of the projects laid out in the state plan.
>
> Build it will and build it must, because the people of California have said it must. But it will build with vital policy decisions about the lands encompassed by the project

hanging fire, decisions which could help to assure the overall success of the entire plan. The department is not making these decisions because it has not been assigned the responsibility for making them. Nor has anyone else.

For example, the department, armed with instructions to build, will soon construct a great reservoir between Merced and Hollister, the San Luis Reservoir, creating an immense lake in a hitherto dry region. A new aqueduct will carry the water farther south along the west side of the San Joaquin Valley. An inevitable byproduct of this project will be a rash of slurban growth in the reservoir area, and further slurban growth down the valley as new water is brought to the west side.

Ten years ago, when the Bureau of Reclamation was preparing a feasibility study on this project, attempts were made to arouse local and state interest in planning for the best use of the lands to be influenced by the project. The state was not interested. Neither were the counties. As a result, and as a result of a continuing lack of state interest, we may expect to see new slurbs wastefully and needlessly overrun great areas of highly productive agricultural land, land made highly productive by the investment of millions of the people's dollars.

Thus, by relying on single agency planning, the state is failing to assume its share of the responsibility for controlling the impact of its water programs on the lands of local communities, not to speak of entire regions. And it is not protecting the people's investment. (1961-62 Water Resources budget: $68.9 million.)

At the very time that the state and the federal governments have built flood protection into water projects through the expenditure of millions of dollars, local governments have allowed the slurbs to build out carelessly on flood plains, as near Redding on the Sacramento River, with the result that the necessary controlled water releases from the storage projects have caused heavy damage. And the state has turned around and subsidized local applications to the federal government for additional flood protection for slurbs that the state shouldn't have allowed to be built there in the first place! Thus, the state almost aggressively fails to protect its own investment in flood protection, and in the doing mocks the orderly development of California's bright lands (46).

Table 2 lists the states that have authority for state planning. Twenty of these states reported that their state planning agencies are primarily concerned with industrial development and/or local planning

assistance (47). Most of these planning agencies are located within departments or divisions of industrial development, commerce, or business and economic development and are generally not administratively able to engage in comprehensive statewide planning activities. Because of this most of the planning agencies have not developed desirable working relationships with the water resource agencies. As a consequence the water resource agencies with functions for reviewing and approving construction of federal flood control projects and watershed development programs have worked independently of the planning agencies. In most instances the review process does not include referral of multipurpose reservoir plans to the state planning agencies.

This lack of effective working relationships between the state water resource agencies and state planning agencies is reflected by the fact that although 42 state planning agencies provide local planning assistance, in 25 of these states the water resource agencies do not distribute flood data that state planning agencies need in providing such assistance to localities.

Some states have state planning agencies which are actively concerned with comprehensive water resource development policies but do not have strong or adequately staffed water resource agencies to develop and implement flood-damage prevention programs. For example, in Tennessee the State Planning Commission has prepared several statewide water resource studies and has been active in providing local planning assistance to guide and control land use in flood plains. However, the water resource agencies in Tennessee do not have adequate staff to prepare and implement overall flood-damage prevention programs. For example, the Tennessee State

Soil Conservation Committee had received applications as of April 1960 from 51 watersheds for planning assistance. These 51 watershed projects comprise a total of approximately 2,200,000 acres. The Federal Government had spent approximately $445,000 on small watersheds planning for these projects, and their estimated cost of construction is approximately $8,091,000. The State Soil Conservation Committee, originally established to supervise the activities of soil conservation districts within the state, has been assigned responsibility for establishing priorities for these projects. Yet it does not have a planning staff to assist it in establishing a state comprehensive watershed plan which could provide the framework for realistically assigning priorities in terms of basic state development policy (48).

Federal-State Relationships

The states are not the only level of government concerned with flood problems. In addition to the state programs there are many Federal action programs directly involved in flood-damage prevention. These include the programs of the Corps of Engineers, U. S. Geological Survey, U. S. Weather Bureau, Soil Conservation Service, Bureau of Reclamation, and the Tennessee Valley Authority. The extensive water resource activities of these Federal agencies have a significant impact on the administration of state flood-damage prevention programs. As a result the administration of state programs for flood-damage prevention must include consideration of the relationships which exist or which can be established with the Federal agencies.

The Federal agencies usually work directly with state agencies in carrying out individual water resource projects. However different

Federal agencies work with different state agencies even within the same state. For example, the Corps of Engineers usually works with the state water resource agencies while the Soil Conservation Service prefers to have a special state committee with which to work. In the absence of coordination of water resource activities at the Federal level and at least some basis for coordination within the states, the various Federal programs exert pressures that tend to divide state water programs rather than encourage their unification.

Not only do the different Federal water agencies work with different state agencies but their projects are not scheduled according to agreed-upon over-all state priorities. Rather, they are scheduled according to priorities developed by the Federal agencies while working with their separate state counterparts. Decisions on individual projects are made as the separate state agencies are able to secure sufficient support to obtain state funds necessary for a particular Federal project.

Moreover, since the major share of Federal monies go to flood protection works, the strongest relationships are between Federal and state agencies whose primary concern is with flood control. The state agencies who are primarily concerned with land use controls are not included, yet the activities of these agencies constitute one of the special contributions which the states can and should be making to flood-damage prevention programs. This emphasizes the earlier reference to the need for collaboration between Federal and state agencies in over-all planning as well as in the design phases of a flood control project.

The problem of intergovernmental relation has been recognized as one of primary importance in many developmental fields. In recent years

several study commissions have devoted a great deal of attention to this subject as one of the key factors in the solution of developmental problems. To provide background for appraising what kinds of Federal-state relationships might be most productive in helping to guide land use in flood plain areas, some of the existing relationship patterns in other fields were investigated. This investigation indicated that no single pattern of Federal-state relationships exists for all fields of governmental activity. The pattern followed in any particular program seems to depend upon the perspective and purposes behind the relationships.

In highway construction, for example the Federal agency sees its role as that of providing over-all planning for the national highway system and it has attempted to develop strong state agencies that will carry out for their regions detailed planning, construction, and maintenance programs for highways. All Federal highway grants are channelled through the states. No direct Federal assistance for highways is given to city and county governments. The state highway departments may make grants-in-aid to county highway departments or, as in the case of North Carolina and Virginia, may designate all rural roads as state highways and abolish the county highway departments.

Similarly, most of the Federal public health programs seek to establish national standards of public health and within this framework they attempt to strengthen state public health agencies which can plan and carry out an effective statewide health program.

In contrast, in the field of housing and urban renewal the Federal government has worked directly with local governments on problems of preventing blight and deterioration of urban areas. The states

have been by-passed and as a result most of them have not been actively involved except to the extent of providing legislation to permit local action and in some cases providing local planning assistance.

A more "middle of the road" policy has been established by the Federal Aviation Agency. Here the policy is to authorize the states to determine whether Federal financial assistance shall be channeled through the state aviation agency or go directly from the Federal government to cities and counties.

This study shows that a comprehensive flood-damage prevention program must encompass many activities other than the traditional flood control measures. The control and guidance of land use in flood plains is an important part of such a program. If progress is to be made in incorporating land use considerations into flood-damage prevention programs, states must play a more active role because Federal concern with land use is at best indirect and peripheral.

Therefore, development of broad flood-damage prevention programs involving both flood control and land use planning depends to a considerable extent upon the ability of the Federal agencies concerned and state governments to establish effective working relationships in all aspects of program planning and execution.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Comprehensive flood damage prevention programs include land use regulations as well as flood control works.

Although the Federal flood control agencies and the states have done a good job in building flood control works, the absence of land use regulations for flood plain areas has caused the national flood damage potential to increase. Reduction of flood damage potential will depend upon the development of comprehensive flood damage prevention programs.

An effective statewide water resource program is prerequisite to the development of comprehensive flood damage prevention programs. The most effective water resource programs are found in those states that have made one agency responsible for administration of all water resource functions or have placed most water functions under a single agency. Unfortunately, very few states have effective water resource administration. Most state water resource programs are administered by two or more agencies without proper coordination between the agencies.

An active statewide planning program is essential to the effective development of a state water resource plan. State water resource agencies have functioned most effectively where state planning agencies also have been concerned with flood problems and have made progress in developing comprehensive statewide plans and policies to which water programs could be related.

Very few states have developed overall statewide planning programs. Most state planning agencies have been located in departments of economic or industrial development and have usually limited their planning efforts to the interests of the respective departments. The most effective planning programs were found in those states where the state planning agency was located in the office of the Governor or in one of his staff agencies.

The elements of a statewide flood damage prevention program were found to include: (1) land use regulations; (2) coordination of state programs; (3) financial assistance for local agencies; (4) technical assistance; and (5) coordination of state and Federal activities.

There is very little land use regulation at the state level. A few states have enacted floodway or encroachment statutes. Only one state, Hawaii, has established state zoning regulations. The rest of the states have adopted enabling legislation which permits local governments to adopt zoning regulations. However, many local governments have not been able to use zoning powers effectively because flood plain areas frequently extend into several governmental jurisdictions whose officials are unwilling or unable to cooperate in adopting and enforcing regulations that are uniform for the watershed. With reference to land subdivision regulations a few states exercise plat review although this review is limited to consideration of health standards.

Very few of the state water resource agencies have attempted to guide or coordinate the activities of other state agencies whose programs have an impact on flood problems. Most of such agencies haven't even furnished flood information to the other state agencies.

Financial assistance has been used by some states to enable local governments to participate in Federal flood control projects. Connecticut has made grants to localities for urban renewal projects in flood plain areas. Most states have not recognized the value of state grants and loans in assisting local governments in financing flood damage prevention programs.

Technical assistance in interpreting flood data and preparing local regulations has been provided by some state water resource agencies as a method of guiding and controlling land use in flood plains. Most states have not provided necessary staff or funds to enable their water resource agencies to give such assistance. In the absence of such assistance, few local governments have been able to effect flood damage prevention programs. Local planning assistance is provided by some states and this helps communities relate flood plain land use plans to overall community plans. The Tennessee local planning assistance program offers useful precedents which other states might find of value.

Coordination of over-all state and Federal flood damage prevention activities has been ineffective in most states. Federal flood control agencies have achieved a degree of coordination with each other through the medium of requirements and procedures for Federal inter-agency review of Federal flood control and water resource projects. Most states have designated separate agencies to work with each Federal flood control agency in reviewing Federal project plans. Activities and policies of these separate state agencies have not been effectively coordinated except in those states where a single agency has been made responsible for administration of an over-all water resource program. Federal

inter-agency coordination has sometimes resulted in a degree of coordination of state programs but such coordination has been based on Federal agency objectives rather than over-all state objectives.

As a result of the experience gained in this study, it is recommended that the states consider the following measures to organize for and to develop state programs to guide and control land use in flood plains.

Organization for Flood-Damage Prevention

1. The states should establish a single agency responsible for over-all water resource administration. Those states that now have several water resource agencies concerned with flood problems should place such agencies in one department. Where this is not feasible, the states should make every effort to establish procedures which will encourage close coordination between the separate agency programs.

2. The state water resource agency should have responsibility for flood control activities as well as land use regulations in flood plains.

3. The state water resource agency should establish regional offices to plan and administer regional water resource programs including flood damage prevention activities.

4. After the regional water resource programs have been initiated the states should establish regional water resource authorities which would be able to contract with local governments and receive state grants to provide necessary regional water resource administration. These regional authorities would be similar to the Muskingum Watershed Conservancy District except that they would not have taxing powers.

5. Where flood problems extend beyond state boundaries the state water resource agency should work cooperatively with other states and the Federal government to establish an interstate compact which would enable the states to cooperate with each other and with the Federal government in administering programs to alleviate flood problems. The Delaware River Basin Compact and other interstate compacts offer useful precedents in this connection.

6. Each state should establish a state planning agency responsible for development of comprehensive state plans and policies. Those states that have placed state planning agencies in departments of economic or industrial development or in other line departments should transfer such planning agencies to the office of the Governor or to one of his staff agencies.

7. The state planning agency should assist the state water resource agency in preparing and keeping current a statewide water resource plan that relates water resource policies and programs to overall state development policies. The state planning agency could also assist the state water resource agency in determining the location of regional offices and later in determining areas of jurisdiction of the regional water resource development authorities mentioned above.

8. The state planning agency should establish regional offices to prepare regional plans which could serve as a frame of reference for the preparation of the regional plans of the water resource agency. After regional planning programs have been initiated, the state planning agency should promote the establishment of regional agencies which would be authorized to receive funds from the local, state, and Federal

governments to employ necessary staff to develop a planning program for such regions. Areas included in such planning regions might encompass parts of two or more regional watershed conservancy districts. Close cooperation between the water resource agencies and the planning agencies at the state and regional level will be essential to the solution of flood problems in those areas. Connecticut found that regional watershed areas were not necessarily the most logical areas for regional planning. The states should realize this in establishing regional planning programs and regional water resource development programs.

Elements of a State Flood-Damage Prevention Program

State water resource development agencies should establish comprehensive flood damage prevention programs which would include the following elements.

1. The state water resource agency should collect and interpret flood data and distribute them to other state agencies and to local governments. Where regional water resource agencies have been established the state water resource agency should distribute such data through them. It should establish priorities for local flood information studies prepared by the Corps of Engineers, the Tennessee Valley Authority and other Federal agencies.

2. The state water resource agency should actively promote a better understanding of flood problems by other state agencies whose activities affect land use in flood plains. The state and regional water resource agencies should establish and maintain close working relationships with state and regional offices of other agencies to encourage their

cooperation in recognizing flood problems. In this connection state policies should be adopted which would require that state funds for state or local projects be withheld if such project plans violate state policies and standards for guiding and controlling land use in flood plains.

3. The state water resource agency should cooperate with the state planning agency in providing and enforcing state zoning and subdivision regulations to guide and control land use in flood plains.

The following procedures are suggested for such regulations. The state planning agency would prepare the proposed regulations. The state legislature would adopt the regulations and a state building inspector or other designated official would administer them for the state water resource agency. Where local governments adopt zoning and subdivision regulations which are equal to or exceed the restrictive requirements of such state regulations, the state regulations would not apply. At the local level the local planning agency would prepare such regulations and the local legislative body would adopt them. The local building inspector or other designated official would enforce the regulations, subject to the approval of the state water resource agency. In this latter situation the state water resource agency might designate its regional offices or a regional water resource development authority to serve as the approving agency. State and regional water resource agencies should work cooperatively with the appropriate planning agencies to make certain that regulations within the flood plains are in harmony with the plans and regulations for the surrounding areas.

5. The state water resource agency should provide local governments

and other state agencies with technical assistance in interpreting flood information, in drafting local land use regulations for flood plain areas, and in reviewing plans for construction of local public works in areas subject to flooding. Where regional water resource development authorities have been established they should provide such technical assistance to local governments. At the state, regional, or local level the technical assistance should be furnished cooperatively with the parallel planning agency.

6. The state water resource agency should be given responsibility of reviewing plans for Federal flood control projects. State water resource agency personnel should cooperate with Federal flood control agency personnel in the early stages of project planning and development and should maintain contact with the Federal agencies throughout the entire project planning period. In this connection the proposed statewide comprehensive water resource plan prepared by the state water resource agency with the assistance of the state planning agency as recommended above would provide a positive basis for the coordinated review of such projects. Where the states do not place all water resource functions in a single agency the Governor should establish procedures for joint review of such plans by the several water resource agencies with the assistance of the state planning agency.

In summary, the kinds of organizations and programs recommended above should enable the states to find solutions to flood problems in relation to their over-all land and water needs. The role of the states should be to use these organizations for relating Federal, state, and

local flood control programs to state and local land use development and control measures in order to effect a comprehensive flood damage prevention program that would result in a decline in the annual flood damage potential of the nation.

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